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EXAMINER	
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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

In view of the after final remarks, filed on 04/15/2009, following **rejections** are **maintained** for the reason of records, as given in the previous office action. The basis of theses rejections are the same as given in the office action, mailed on 01/16/2009.

- Rejection of claims 1- 6, 11, and 13- 18 under 35 U.S.C. 103(a) as being unpatentable over Barnes et al. (US '412) in view of Mayer et al. (Journal of Crystal Growth 201/202 (1999) 318-322)
- Rejection of claims 19- 20 under 35 U.S.C. 103(a) as being unpatentable over Barnes et al (US' 412) in view of Mayer et al, and further in view of Hooper et al. (US '103)

Response to Arguments

Applicant's **arguments** filed on 04/15/2009 have been fully considered but they are **not persuasive**.

Applicant argues that "one skilled in the art would not conceive that what is described in the cited passage of Mayer, occurring at 29-80° K (the equivalent of -244.15° C to 193.15° C) could be relevant to any process being performed above 900° C, as disclosed in Barnes. In fact, with respect to growth processes Mayer discloses only that growth temperatures should be around 750° C (See Mayer at section 4, second paragraph), and only in relation to

dissolving Mg-H complexes such that a higher density of charge carriers is formed. There is, therefore, no disclosure or suggestion in Mayer to reduce carbon contamination in the manner claimed." (See page 3, lines 19- 23 and page 4, lines 1- 9)

Applicant's arguments was fully considered but was **not** found **persuasive** because first of all, as recited in the previous office actions, Barnes et al. (US '412) teaches a method of growing the substrate which is heated to a **desired** temperature for MBE growth, and further, the substrate temperature during the growth process is preferably, at least 850° C and at the most 1050° C (See Barnes et al (US '412), paragraph [0035]); therefore, this temperature reads through the temperature of at least 800° C and at the most 1050° C and clearly also reads through the temperature of 920° C and 960° C. As also recited in the previous office action, Mayer et al. teach during MBE process bis (cyclopentadienyl) magnesium (CP_2Mg) is used as a p-doping source during reactive MBE process and further teach the intensity of all bounds exciton decreases with increasing temperature, and the free excitons dominate the spectra at temperatures **above** 29 K and at **about** 80 K. (See page 320, right column, lines 5- 10) As also recited, previously, Mayer et al. clearly disclose the use of (CP_2Mg) at a prefer temperature, wherein in combination of Barnes et al ('412) and Mayer et al, the temperature would be obvious to be within 920° C and 960° C; wherein as a function of MBE process operation in this temperature range, the contaminations such as Carbon contamination in the

semiconductor material decreases. (Please see previous office action, page 6, lines 11- 19)

Moreover, as recited in the previous office action, it would have been obvious for one of ordinary skill in the art at the time of applicant's invention to modify the teachings of Barnes et al ('412) through providing bis(cyclopentadienyl) magnesium (CP_2Mg) because bis(cyclopentadienyl)magnesium (CP_2Mg) has a capability of complete dissociation in the MBE chamber for P-type doping of the semiconductor layer in the MBE chamber, and further implementing the growth process at an increased temperature which reduces the carbon contamination caused by (CP_2Mg) in the semiconductor material in order to decrease all bound excitations in which this effect result in reducing the segregation of impurities and dopants at dislocations and the formation of cracks in AlGaN layers during device operation, as suggested by Mayer et al. (See office action mailed on 01/16/2009; pages 6, lines 20- 22 and page 7, lines 1- 9)

Also, claims 19-20 maintain rejected for the same reason as recited in the previous office action and because of their dependency to a list of rejected claims.

Therefore, **the rejection of claims 1-6, 11, and 13-20 are maintained.**

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Masoud Malekzadeh whose telephone number is 571-272-6215. The examiner can normally be reached on Monday – Friday at 8:30 am – 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin, can be reached on (571) 272-1189. The fax number for the organization where this application or proceeding is assigned is 571-272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance form a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SEYED M. MALEKZADEH/

Examiner, Art Unit 1791

/Steven P. Griffin/

Supervisory Patent Examiner, Art Unit 1791